Incorporating the dimensions of sustainability into information systems projects

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A B S T R A C T

Although research has been done on sustainability in project management, little or no research has been conducted on sustainability within the domain of information system (IS) projects. This article reports on whether IS projects are executed sustainably and whether they contribute to organisational sustainability. A questionnaire, completed by 650 IS project managers, was used to determine the state of IS project sustainability. The results highlight that sustainability is not integrated into IS projects and IS project managers do not consider organisational sustainability. IS projects tend to focus on the economic dimension, i.e. increasing productivity and profits, with no thought being given to the social and environmental dimensions. This article recommends that sustainability should be incorporated into project management and IS best practices. Accordingly, the way IS projects are executed should be re-evaluated in terms of their sustainability.

Key words: sustainability, project management, information systems, South Africa

Introduction

In an organisation, information systems (IS) entail the planning, development, implementation and management of information technology (IT) infrastructure, data and enterprise-wide information processing systems (Gunasekaran, Love, Rahimi, & Miele 2001; Topi et al. 2010) which are implemented through projects. IS projects specifically are executed to bring about change and to ensure that the organisation maintains competitiveness and continues operating. IS projects can be of an operational nature, i.e. upgrades or maintenance, or they can be for new products or services. IS projects themselves need to be executed in a sustainable

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manner and, more importantly, the deliverable should contribute to the sustainability of the organisation (Keeys 2014).

IS project management as a business process can contribute to the sustainability of an organisation by incorporating sustainability in the project management processes (Garies, Huemann, & Martinuzzi 2013). Various authors have emphasised the importance of sustainability as a managerial issue in the past few years (Hopkins, 2009; Kiron, Kruschwitz, Rubel, Reeves & Fuisz-Kehrbach 2013). For example, they argue that organisations cannot shy away from their responsibility towards sustainability and it is even compulsory in some instances to report on this issue. Sustainability is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development (WCED) 1987). Martens and De Carvalho (2014) divide sustainability into three dimensions, i.e. economic, social and environmental. The economic dimension focuses on maximising profit, reducing costs, growing revenue and improving quality, which are considered to be some of the traditional business imperatives. The social dimension refers to the communities in which organisations operate, as well as the employees of an organisation, which means organisations should take cognisance of the communities in which they operate and of their employees. The environmental dimension is concerned with the physical environment that people inhabit.

Keeys (2014) makes the argument that projects are the vehicles for implementing sustainability in an organisation. The incorporation of the three sustainability dimensions into the project itself ensures adherence to the sustainability principles of the organisation. Literature on project management and sustainability is appearing but at a very slow pace, and is currently about the incorporation of sustainability into project management and not necessarily about project management's contribution to organisational sustainability. The current focus of the literature is also on construction and civil engineering projects in developed countries and in China as an upcoming nation (Nannan, Ronggui, Radosavljevic, & Hua 2011; Zheng, Shuibo, & Zhulin 2011).

Africa, especially sub-Saharan Africa, is perceived as a potential point of growth, and projects, irrespective of the industry, are executed all over the African continent (Marnewick 2013). There is currently no knowledge of whether these projects are incorporating the sustainable dimensions or whether they contribute to the sustainability of the organisation itself or the African continent at large. Insight into project management sustainability practices is thus needed to ensure that Africa is not depleted of her natural and human resources and that organisations involved in Africa focus on a long-term commitment and not just on a "what's in it for me" kind of relationship (Zhang, Wu, Shen, & Skitmore 2014).

Various South African financial and telecommunication companies are expanding into sub-Saharan Africa and business-type projects have been launched to aid this expansion. These business-type or IS projects might not have the same impact on Africa's natural resources as construction, mining and civil engineering projects, but they do have a more direct impact on the sustainability of the organisation itself. Organisations are employing indigenous Africans as part of this expansion and the collapse of any organisation would have a devastating impact on the economic and social dimensions of the community in which the organisations operate (Ernst & Young 2012). To date, no research has been conducted into the way business and IS projects within the African context incorporate the dimensions of sustainability and whether these projects deliver benefits to the organisation and ultimately ensure the long-term existence of the company and well-being of its employees. The problem is compounded by the fact that there is also no research on project sustainability within the African context.

The research reported on in this article focused on how organisations are incorporating sustainability into IS projects. Organisations, and their respective projects, that are operating in sub-Saharan Africa were investigated to classify the way sustainability is applied through project management. The research examined all three dimensions of sustainability, i.e. the economic, environmental and social dimensions, and the intra-relationship between these three dimensions. Insight into IS project sustainability contributes to the current body of knowledge, but it was also important to determine whether IS project managers are taking into account the sustainable management of a project as well as the sustainability of the project deliverable. This knowledge can be used to raise awareness about sustainability among project managers.

The article is divided into four sections. The first section deals with the literature on sustainability as well as how sustainability is incorporated into project management. The second section covers the research methodology and how the results were collected from the various respondents. The third section is an analysis of the results of the 650 respondents. The focus of the analysis is on the three dimensions of sustainability and how they are incorporated into IS project management. The fourth and last section specifies the danger of ignoring sustainability and the impact this has on the overall sustainability of the organisation. This section also focuses on the managerial implications as a consequence of the results.

Literature Review

FDI and sustainable development in Africa

An analysis of foreign direct investment (FDI) projects indicates that, over the past 10 years, Africa has witnessed an increase of 87% in inward FDI (Ernst & Young 2012). Africa per se has remained an attractive investment destination throughout the global downturn and has managed to maintain its relative share of global investment flows as a result (Pickworth 2011; Vadra 2012). When it comes to investment strategies, Africa is high on the agenda of global investors, with 42% of businesses considering investing further in the continent and an additional 19% of executives confirming that they will maintain their operations on the continent (Amadasun & Ojeifo 2011).

In the period 2008 to 2010, an estimated 700 new FDI projects were launched in Africa (Otty & Sita 2011). There are several reasons for this increase in FDI, one being that nine of the fifteen countries in the world with the highest rate of five-year economic growth are African countries (Baden 2010). Another reason is that foreign countries are investing in infrastructure improvements on the continent (Kandiero 2006). One example is China, which is upgrading infrastructure in countries that it invests in, resulting in a rise in living standards through these investments (Cheung, De Haan, Qian, & Yu 2012). Kolstad and Wiig (2011) are of the opinion that FDI in Africa has led to the scramble for Africa's resources and that the trend is for countries to invest in African countries which are resource-rich. China is one of the countries investing in Africa, as investing in Africa is perceived by some Western countries as too risky (Cheung et al. 2012). China's FDI in Africa increased from 9% in 2003 to 17% in 2009. This growth in investment makes China one of the three largest trading partners of Africa, together with the United States of America and the European Union (Kolstad & Wiig 2011).

There is a concern that FDI in Africa is not sustainable owing to the fact that it might result in unemployment (Cheung et al. 2012). Countries such as China also bring their own skilled people to the countries in which they invest, with the consequence that no upskilling of the local people takes place. Mubangizi (2012) argues that FDI in Africa and other developing countries has led to the eventual impoverishment and devastation of the countries invested in. He asserts that countries and organisations that invest in Africa are driven by financial gains and that overall sustainability is ignored.

It is argued that any local development or FDI in Africa should be sustainable if it is to bear fruit in the long run (Patil & Narula 2012; Amendolagine, Boly, Coniglio, Prota & Seric 2013; Bartels, Napolitano & Tissi 2014). This definition contains two

concepts: needs and especially the needs of the poor, which should take precedence; and the limitations imposed on the environment's ability to meet present and future needs. The WCED's (1987) seminal vision of sustainability states that sustainability needs to be defined in terms of social, environmental and economic development, or people, planet and profit. Extant literature ratifies this view of sustainability and arguably generates consensus around the dimensions of sustainability (Marcelino-Sádaba, Gonzalez-Jaen & Perez-Ezcurdia 2015; Økland 2015; Sánchez 2015; Silvius & Schipper 2015; Martens & Carvalho 2016).

The importance of sustainability internationally forces organisations to reconsider their own sustainability. Organisations are integral to any society and are seen as a natural person who has citizenship (Institute of Directors Southern Africa 2009). They should therefore take cognisance of the sustainability dimensions in their day-to-day running and should take into account both their short- and long-term success. The long-term success of the organisation depends on the extent to which sustainability is embraced by the executives themselves (Thomas & Lamm 2012). Organisational sustainability is then the ability of the organisation to maintain viable business operations, while at the same time not negatively impacting on any social or ecological systems (Smith & Sharicz 2011). Short-term success is based on the various projects that the organisation implements (Silvius & Schipper 2014a).

Smith and Sharicz (2011) state that an appropriate governance structure is needed to ensure that sustainability forms part of the organisation. This view is echoed by the Institute of Directors Southern Africa (2009), which points out that the challenge faced by organisations is to make sustainability part and parcel of the organisation itself and this can only be achieved through integrated performance. The emphasis should be on long-term performance. Social development, being one of the dimensions, is critical within both the South African context and Africa at large, where social transformation is important to address colonial issues (Napier 2010; Philip 2011; Salisu Barau, Stringer & Adamu, In Press). The Institute of Directors Southern Africa (2009: 14) is of the opinion that "integrating sustainability and social transformation in a strategic and coherent manner will give rise to greater opportunities, efficiencies, and benefits, for both the company and society". This means that all FDI in Africa should adhere to this principle and create opportunities for society.

Theories of sustainability and project management

Labuschagne and Brent (2005) maintain that it is easier to implement sustainability at a strategic level than an operational level. The implementation of sustainability at

a tactical level can be achieved through project management which touches on the strategic as well as operational levels of an organisation (Silvius & Schipper 2014b). Marnewick (2012b) establishes project management as the link between FDI and the conversion of these investments into real-life projects. Project management should ensure that FDI is delivered through a product or service; in addition, the investors are looking for a return on investment.

Edum-Fotwe and Price (2009) indicate that the three dimensions of society, economy and the environment need to be addressed appropriately within an organisation. They argue that issues that should form part of the social dimension are less appreciated and addressed by the stakeholders involved in projects (Edum-Fotwe & Price 2009). This sentiment is echoed by Silvius and Schipper who state (2014b: 64): "the most important leadership challenge facing business today is the integration of sustainability into core business functions". In order to do so, the project manager is in a perfect position to influence projects and ultimately the organisation towards greater sustainability. It is also the duty of a project manager to ensure that the project itself takes the project constraints into consideration, but that the deliverable of the project itself contributes to the sustainability of the organisation. Managing projects in such a way ensures that projects have a long-term impact on the three dimensions of sustainability (Wang, Wei, & Sun 2014).

Research on sustainability in project management focuses on construction and engineering projects and not necessarily on business or IS projects. It also emphasises that it is the project manager's responsibility to integrate and incorporate sustainability into the construction project process (Silvius & Schipper 2014b; Wang et al. 2014). A shortcoming of the research referred to above is that it concentrates mostly on the environmental dimension where project managers should assess the environmental aspects of a project and the deliverable itself (Maltzman & Shirley 2014). Sustainability in project management research is neglecting the social and economic dimensions (Elkington 2004; Silvius & Schipper 2015; Martens & Carvalho, In Press).

The question arises whether business and/or IS projects are different from construction and engineering projects, since the former do not necessarily have an impact on the environmental dimension of sustainability. Wang et al. (2014) published strategies that can be incorporated into construction and engineering projects, but these are not applicable to business/IS projects and different strategies should be designed for these types of project. Sustainability in IT has mostly to do with the concept of green IT (Costello 2011; Hedman & Henningsson 2011) where the emphasis is on the infrastructure where green IT "benefits the environment by improving energy efficiency, lowering greenhouse gas emissions, using less harmful materials, and encouraging reuse and recycling" (Murugesan 2008: 24). Little or no

research has been done on the implementation and management of IS. Information systems do run on green IT infrastructure, but according to Silvius and Nedeski (2011), IS can contribute to sustainability if the focus is on the product that is created through the implementation of IS. This is especially the case where the end product is a service or process.

Information systems project management sustainability

Projects are temporary organisations and, as such, should portray the same characteristics as permanent organisations and be regarded as part of a permanent organisation to contribute to its long-term success. This success is based on two aspects: the benefits of the project should be realised and the projects should ultimately contribute to the sustainability of the organisation itself (Silvius et al. 2012). A definition of a project most suitable for the purpose of this article is that it is "an endeavor to create a product, service or result" (Project Management Institute 2013: 3). Within the context of sustainability, this implies two things: firstly, the endeavour should adhere to sustainable practices, and secondly, the product, service or result should contribute to organisational sustainability. Project management, on the other hand, is "the application of knowledge, skills, tools and techniques to project activities to meet project requirements" (Project Management Institute, 2013: 5). The implication is that the project manager should have knowledge of sustainability to ensure that the principles of sustainability are applied to the project. Given this logic, it makes sense to rather refer to project sustainability where the project manager should ensure that the final product, service or result involves the three dimensions of the environment, society and the economy through the application of knowledge of sustainability.

Bannerman (2008) as well as Joseph and Marnewick (2014) are of the opinion that project success is measured on a continuum ranging from the way that the project is managed (project management success), to the success of the deliverable itself (product success) and ultimately to the business and strategic success of the deliverable. The same logic can be applied to a project: the project should be managed in a sustainable manner which leads to project sustainability where the outcome of project sustainability is a deliverable that contributes to the sustainability of the organisation itself.

Just as projects can be delivered successfully within the constraints of the project, but do not contribute to the overall success of the organisation, they can also be managed sustainably without contributing to the sustainability of the organisation. One aspect of managing a project sustainably is the concept of green project

management which entails minimising the environmental impacts of projects. A second aspect is monitoring and controlling the environmental impact of the project deliverable (Dinsmore & Cabanis-Brewin 2014). Research on project sustainability deals with the latter (Edum-Fotwe & Price 2009; Herazo, Lizarralde, & Paquin 2012; Michaelides, Bryde, & Ohaeri 2014).

A project should be successful if the processes, e.g. risk and change management, are executed successfully, and the management of the project is based on the triple constraint of time, cost and scope (Bannerman 2008; Hyväri 2006; Marnewick 2012a). In parallel to managing a successful project, the project manager should also incorporate the three dimensions of sustainability into the project itself (Martens & De Carvalho 2014; Michaelides et al. 2014). It is hence argued that the focus should be on all three dimensions and not just on the environmental dimension, as is currently the case (Edum-Fotwe & Price 2009; Mubangizi 2012; Wang et al. 2014). An argument could therefore be made that a successful project which incorporates all three dimensions of sustainability would have a successful product as a final result. This final product should adhere to all the necessary specifications and requirements and be accepted and used by the customers. Product success then ensures project sustainability where the final product incorporates the three dimensions of the environment, society and the economy. Product success and project sustainability could then lead to overall business and strategic success.

Bannerman (2008) states that there are two aspects of organisational benefits, i.e. business and strategic success. Business success is whether the goals and objectives have been achieved and all benefits have been realised. Strategic success is the impact that the project deliverables have on the market and the industry in which the organisation functions. This ensures that organisations benefit in the long term from the product or service which was developed, taking all three sustainability dimensions into consideration (Silvius & Schipper 2014a). Organisational sustainability is eventually achieved when all the projects in a portfolio are managed in such a way that the vision and strategies of the organisation are implemented without the depletion or destruction of resources (Marnewick 2014a). Hence, projects within the portfolio should deliver on the intended benefits and sustainability as stipulated in the business case (Marnewick 2014b). These intended benefits are measured beyond the lifespan of the project itself. Projects that do not deliver any benefits after completion should not be executed as they do not contribute to the sustainability of the organisation.

It is evident that no research has been done on business or IS projects to determine whether the three sustainability dimensions are incorporated into the management of a project. Given this rationale, the following research questions were posed:

1. To what extent is the environmental dimension embedded into the management of business and/or IS projects?
2. To what extent is the social dimension embedded into the management of business and/or IS projects?
3. To what extent is the economic dimension embedded into the management of business and/or IS projects?

A structured questionnaire was used to test the research questions and the research methodology is discussed in the next section.

Research methodology

Project sustainability has lacked a practical tool which could be used by project managers to assess overall project sustainability. Silvius et al. (2012) have developed a structured questionnaire to assist with the assessment process. This tool covers the three dimensions discussed above: economic, environmental and social. The research reported on in this article was exploratory in nature, so the same questionnaire was used to gain an overall view of project sustainability within the South African context. This provided the researchers with the opportunity to contribute to the current body of knowledge as none or little knowledge existed on whether sustainability is incorporated into projects within the South African context. The same questionnaire was used to conduct a benchmarking exercise by comparing the South African results with the results of Silvius et al. (2012).

The structured questionnaire was based predominantly on closed questions which produce data that can be analysed quantitatively for patterns and trends. The researchers opted for a structured questionnaire because it ensures that each respondent is presented with exactly the same questions in the same order. This was done to ensure that answers could be reliably aggregated and that comparisons could be made with confidence between sample subgroups or between different survey periods.

The questionnaire developed by Silvius et al (2012) consisted of four sections. The first section gathered the biographical information of the project manager. The second section focused on the project itself and determined the type, industry and geographical regions in which the project was executed. The third section dealt with the organisational context of the project itself. The fourth section investigated the sustainability aspects of the project with a specific focus on the economic, social and environmental dimensions of sustainability.

The targeted population comprised project managers within the South African context irrespective of the type of industry or project. Purposive sampling was used to select the project managers as they were part of the specific predefined group. The unit of analysis for the purpose of this article was the IS projects. A total of 2 101 questionnaires were received for all types of project of which only 650 questionnaires were used for statistical analysis for this article because they were business and/or IS projects.

The purpose of any questionnaire is to measure what it is intended to measure and the respondents should interpret the questions as intended (Blair, Czaja, & Blair 2013; Cameron & Price 2009). If a questionnaire does not measure what it is supposed to measure, then the conclusions and statistical analysis might also be invalid. Content validity was used to determine whether the questionnaire actually measured project management sustainability (Field 2013). Content validity is most often measured by relying on the knowledge of people who are familiar with the construct being measured. In the case of this research, the researchers relied on the knowledge of Silvius et al. (2012). Apart from the original research done by Silvius et al. (2012), other research was also conducted based on this questionnaire (Garies et al. 2013; Silvius, Schipper, & Nedeski 2013).

Reliability is concerned about whether a research instrument can be interpreted consistently across different situations, whereas validity measures how well the survey measures what it is supposed to measure (Byrne 2002; Field 2013). As scales were used in the questionnaire, it was very important to check internal consistency. Internal consistency is a measure when assessing scales are used in the survey. Cronbach's alpha coefficient is a reflection of how well the different items complement one another in measuring the same variable (Field 2013). Cronbach's alpha coefficient was calculated for overall sustainability, which consists of the three dimensions, and is reflected in Table 1. Internal consistency levels of 0.7 or more are generally accepted as representing good reliability.

Table 1: Cronbach's alpha reliability tests

Sustainability	Cronbach's alpha	0.846
	Number of items	3

The sample of 2 101 responses included project managers involved in various types of project. This research, however, focused on IS projects specifically and from the 2 101 responses, a total of 650 IS projects were analysed based on the three dimensions of sustainability in project management.

Analysis and discussion

The investment in IS projects in the African continent runs into billions of South African rand, as per Table 2. Only 642 IS projects are represented in Table 2, as the budget for eight projects was not indicated on the questionnaire.

Table 2: Information systems project investments (South African rand)

Industry Sector	Budget				Total
	<R1 million	Between R1 & R10 million	Between R10 & R100 million	> R100 million	
Agriculture	0	2	1	0	3
Industry	2	8	0	0	10
Energy	4	10	5	5	24
Building and construction	0	3	0	1	4
Healthcare	21	21	0	0	42
Wholesale and retail	1	8	3	3	15
Logistic services	0	5	3	1	9
Financial services	58	97	78	17	250
Facility and real estate services	3	4	1	0	8
Legal services	0	1	0	0	1
HR services	9	2	1	0	12
ICT services	19	74	39	7	139
Consulting	4	3	5	0	12
Public administration	6	21	14	4	45
Education and training	4	8	10	0	22
Other	14	19	9	4	46
Total	**145**	**286**	**169**	**42**	**642**

It is evident that most of the investments are in the financial and information and communication technology sectors, with 61% of IS projects falling into these two sectors. This can be attributed to the expansion of South African financial institutions and mobile operators into Africa.

An analysis of the data reveals that 76% of the projects had between one and 15 partners. These partnerships cover the social dimension of sustainability and the impact of these partnerships, as each partnership employs people who in turn feed an entire family.

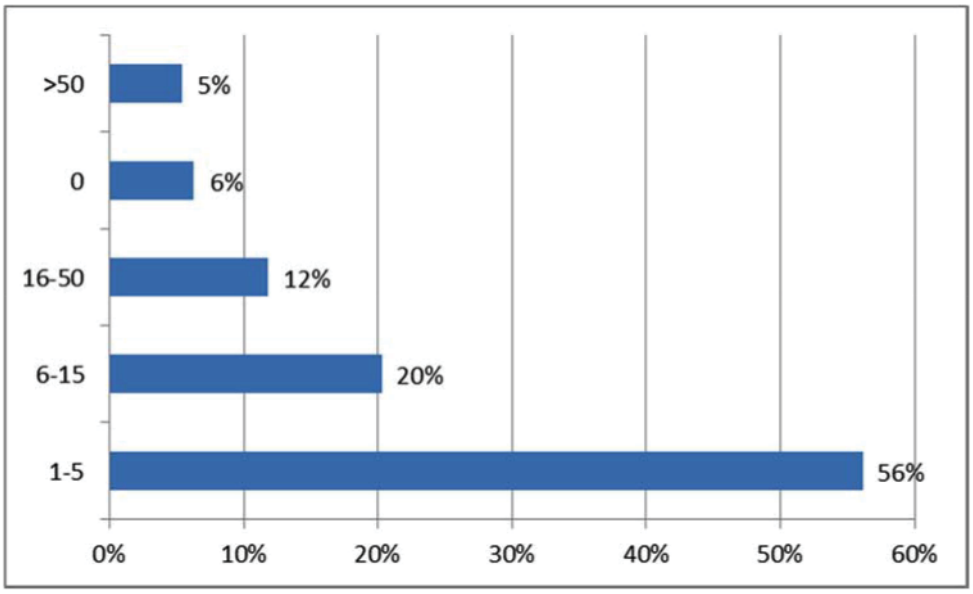

Figure 1: Number of business partners

The results of Figure 1 and Table 2 highlight that IS projects should be investigated in terms of sustainability. Huge amounts of money are spent on IS projects and various stakeholders are directly affected either by the project or by the deliverable of the project. The three dimensions of sustainability and how they are addressed by IS project managers are discussed in the following sections.

Economic dimension

Respondents were asked to indicate how their organisation viewed sustainability in project management from an economic point of view. This was done based on the maturity scale of Silvius et al. (2012), where level 1 implies that sustainability is barely addressed, up to level 5 where sustainability is entrenched in the organisation and is part of the daily lives of project managers and team members.

The economic dimension consists of three aspects: direct financial benefits, managerial flexibility and optionality as well as investment evaluation (Silvius et al.

2012; Silvius & Schipper 2014a). The results are presented and summarised in Figure 2.

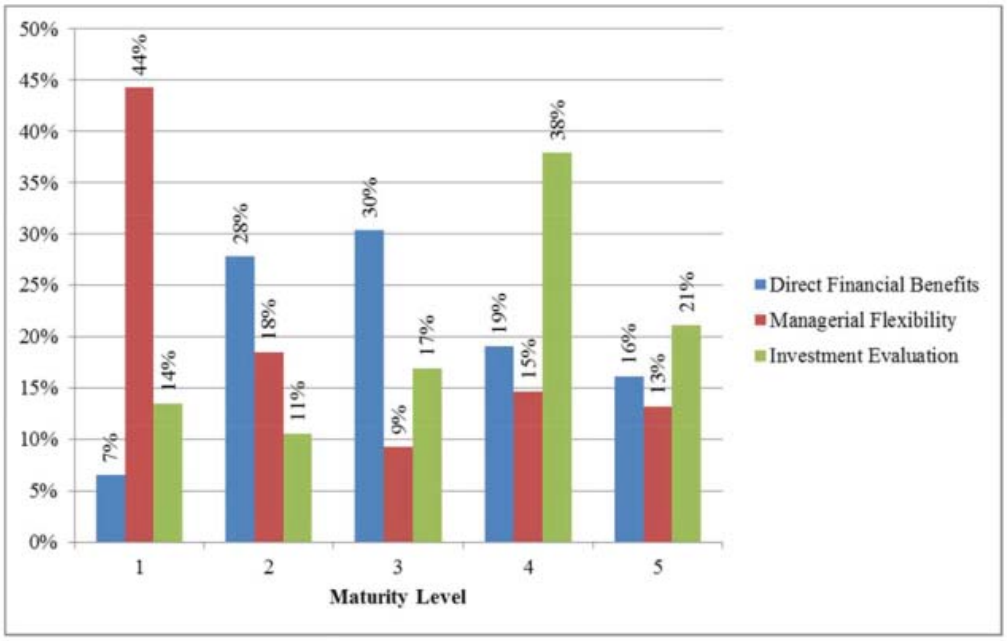

Figure 2: Maturity of economic dimension aspects

Direct financial benefits focused on the types of benefit recognised in the business case of the project. The results show that 28% of respondents stated that their organisation recognised financial benefits in terms of cost savings (level 2). Furthermore, 30% stated that the organisation recognised financial benefits in terms of improved business processes (level 3). Some 65% of IS projects were implemented at maturity levels 1 to 3. The direct financial benefits maturity results for levels 4 and 5 were 19% and 16% respectively. Long-term considerations where the benefits are recognised in terms of additional revenues from new business models and innovated products and services (levels 4 and 5) were therefore not sufficiently instilled in the organisation.

The implication is that organisational business processes are developed and implemented in terms of cost savings. This is a short-term approach to sustainability in IS project management.

The managerial flexibility and optionality aspects assessed the extent to which the project allowed for future decision-making and real options. The results show that 44% of IS projects were designed as optimally as possible given current knowledge and that future decisions may or may not be included in the design. Organisations

thus focus on developing optimal managerial flexibility and optionality, but with questionable focus on incorporating future decisions. This implies that organisations are primarily concerned with short- rather than long-term managerial flexibility and optionality and overall economic sustainability.

The investment evaluation aspect included the evaluation methods organisations used in the selection of IS projects. The majority (38%) of IS project investment evaluation in organisations was selected predominantly on the basis of long-term strategic value in combination with their short-/medium-term returns. The selection of IS projects is mature given the fact that 59% respondents operated at maturity levels 4 and 5. The implication is that organisations select and implement IS projects based on the long-term strategic value, but there is still considerable focus on short- to medium-term returns.

The overall picture of the economic dimension indicates a perpetual focus on short-term benefits. This goes against the notion that true sustainability in project management is achieved over the long term (Wang et al. 2014; Zhang et al. 2014). The perception is that organisations are primarily concerned with satisfying stakeholders who have financial interests in the organisation and thus are pressured into demonstrating these benefits as soon as possible. Furthermore, it is clear in Table 2 that IS projects require significant financial investment, which further pressurises organisations to realise short-term benefits. Organisations are so focused on the short-term benefits that long-term benefits are seen as an additional burden. Sustainability in project management should have a long-term approach to ensure project sustainability and ultimately organisational sustainability.

Proposition 1: IS projects do contribute to organisational strategies and add value. IS project managers should ensure that the direct financial benefits are explicitly listed in the business case and that they are in accordance with IT governance frameworks such as COBIT (IT Governance Institute, 2012).

In the following section the sustainability of IS project management is presented and discussed through the lens of the environmental dimension.

Environmental dimension

The environmental dimension specifically entailed procurement, materials, energy, water, waste and travel during the implementation of IS projects. Some of these aspects involve the notion of green IT. The results are presented and summarised in Figure 3.

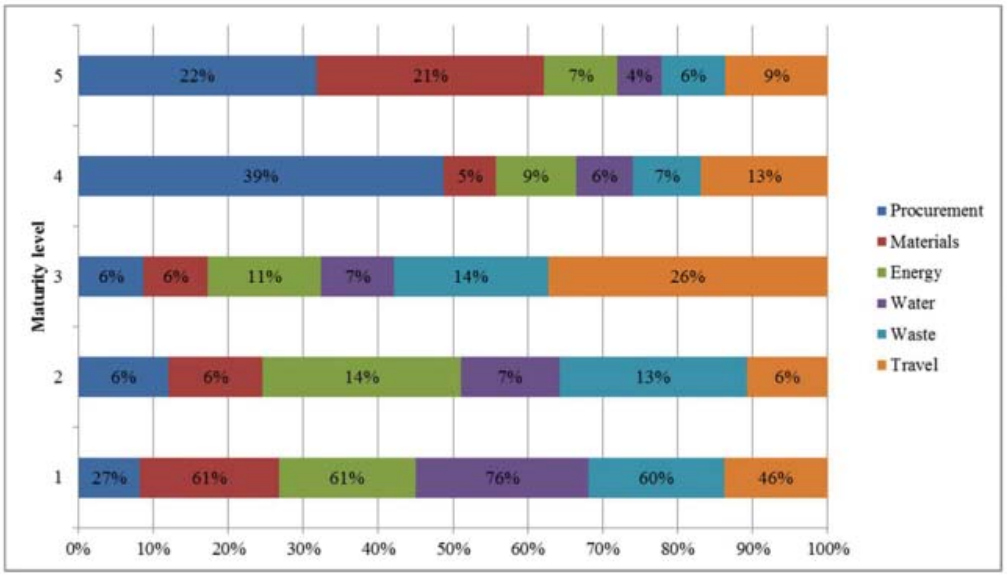

Figure 3: Maturity of environmental dimension aspects

Procurement dealt with the criteria used to select project suppliers and the results indicated that 61% of IS projects procured at maturity levels 1 and 2 of sustainability. These suppliers were selected based on their prices and location to minimise transport cost. A quarter of the suppliers were selected based on their know-how and how the partnership could assist sustainable project delivery. The results implied that IS project managers focus on minimising cost when selecting suppliers (the economic dimension) and not necessarily on sustainable procurement. IS project managers consider cost and location as key criteria for supplier selection and have minimum long-term focus on selection based on their supplier's knowledge and how the partnership can aid products and services to contribute to organisational sustainability.

The materials aspect examined the criteria used to select materials for IS projects. The majority of the respondents (61%) indicated that materials were selected on the basis of their technical and functional requirements as well as costs (maturity level 1).

Proposition 2: Although it is important to select materials according to technical and functional requirements, the concern is that cost plays an increasingly important role as a selection criterion. This relates to the short-term philosophy of economic sustainability, as per the economic dimension results. Cost is seen as a key area of concern rather than selecting materials which have minimal negative impact on the environment. It can be deduced from the results (figure 3) that more importance is

placed on the economic dimension rather than the environmental dimension. This arguably contradicts the notion that more emphasis is placed on the environmental dimension than economic and social dimensions (Elkington 2004; Martens & Carvalho, In Press; Silvius & Schipper 2015).

The energy aspect entailed whether IS projects had any specific policies regarding energy consumption. The results have shown that 86% of IS projects either did not have specific policies or had generic, low-detail policies for energy consumption. This implies that organisations and consequently the projects they implement are not concerned with energy consumption during a project.

Proposition 3: This could be a result of needing to deliver a project within the allocated time frame. However, resources are depleting at a rapid rate, requiring organisations to be more vigilant in minimising energy usage (Hwang & Ng 2013; Martens & Carvalho, In Press). Furthermore, alternative and sustainable energy such as solar energy should be used during the project management phase where possible (Hwang & Ng 2013; Patil & Narula 2012). Although the output of an IS project should ensure organisational sustainability via green IT (Murugesan 2008), the project management processes should also implement sustainable energy usage (Patil & Narula 2012; Wang et al. 2014).

Similar to energy, the water question assessed whether IS projects had any specific policies regarding water consumption and pollution. Comparably, the results show that 90% of IS projects operated at maturity levels 1 to 3 where there were no specific policies or there were generic, low-detailed policies for water consumption and pollution. Water usage policies were almost non-existent, implying that water usage is not on an organisation's project management sustainability agenda. This could also be a result of continual focus on delivering a project on time and ensuring stakeholders' satisfaction at whatever cost. Water scarcity has become a global phenomenon and organisations can no longer exploit water usage (United Nations 2012). The results suggest that organisations should develop and implement detailed water usage and pollution policies to ensure and achieve project management sustainability.

The waste aspect aimed to determine how the organisation minimised waste during IS project implementation. Astonishingly, the majority of respondents (60%) indicated that there were no policies for handling waste. Together with the other 27% of projects that operated at maturity levels 2 and 3, a total of 87% of IS projects were doing little or nothing to minimise waste. Organisations are therefore not concerned about the negative impact of waste on the environment.

Proposition 4: Moreover, project waste could arguably have a knock-on effect on society, as this waste could have an adverse impact if disposed near communities. A case in point is a factory in China that supplies Apple with iPhone and iPad

parts. The factory dumps toxic chemicals directly into the sewer system, which has a negative impact on the community (Kravets 2014). This aligns with the notion that stakeholders do not fully appreciate the long-term impact on society when they purchase or use technology (Edum-Fotwe & Price 2009).

Travel is the final aspect of the environmental dimension and assessed the extent to which IS projects applied travel policies with regard to the environment. At maturity level 1, travelling in the project is based on necessity for the project's activities and deliverables. Means of travel are selected on costs and time. At maturity level 5, the project deliverable and result are designed to minimise travelling. The results show that 52% of IS projects applied travel policies that concentrated on saving time and cost. Time and cost thus surface again as key selection criteria during IS project implementation. This implies that the selected organisations do not consider the adverse environmental impacts of travel methods such as flying on the environment.

Proposition 5: Organisations could utilise technology as a means to minimise travelling, especially with the ubiquitous nature of IT (Jenkin et al. 2011; Marnewick 2015). This was the case in 26% of IS projects where travel in the project was based on necessity and minimised by actively promoting and facilitating the use of alternatives for travelling, e.g. video conferencing.

A holistic assessment of the environmental dimension in IS project management paints a clear picture that these organisations are primarily concerned with cost and time. Furthermore, they do not have appropriate environmental policies in place. It could be argued that they are not exploiting the potential of technology during the lifespan of an IS project as a direct result of not having appropriate policies in place. Moreover, this signifies that project sponsors and managers are not embracing long-term sustainability in project management as much as they should (Thomas & Lamm 2012). Interestingly, the procurement results are contradicted by the other results, as they indicate that suppliers are chosen to ensure that the project is delivered in a sustainable way. Future research should investigate why there is a disjoint between the results of procurement and those of the other environmental aspects.

Proposition 6: Although IS projects do not have an environmental impact like engineering and construction projects, the important role that IS projects play in the environmental dimension should not be negated. IS project managers should re-evaluate the way in which they engage with the six aspects of the environmental dimension.

The impact of IS projects on the social dimension of sustainability is presented and discussed next.

Social dimension

This section consisted of seven aspects: labour practices and decent work, health and safety, training, education and organisational learning, diversity and equal opportunity, human rights, society and customers as well as bribery and anti-competitive behaviour. The results are presented and summarised in Figure 4.

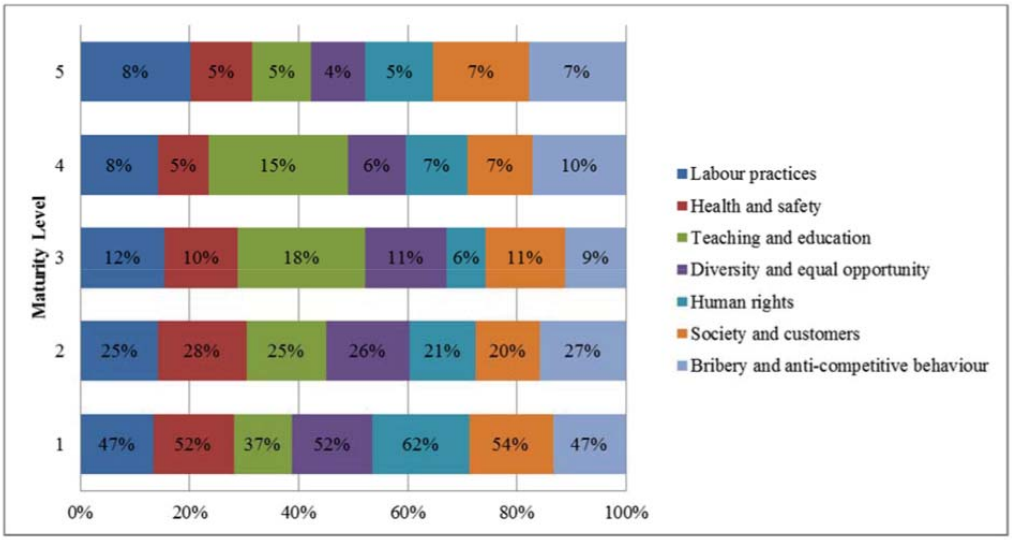

Figure 4: Maturity of social dimension aspects

The majority of respondents (47%) indicated that IS projects complied with applicable standards and regulations for labour practices and decent work, while more than half of the respondents (52%) indicated that IS projects complied with applicable standards and regulations for health and safety. Similarly, 52% of respondents stated that the organisation complied with applicable standards and regulations for diversity and equal opportunity. Furthermore, 62% of respondents stated that the organisation complied with applicable standards and regulations for human rights. These results suggest that the bare minimum with regard to the standards and regulations governing each area are applied in IS projects. IS projects are operating at maturity level 1 in terms of basic human dignity.

Proposition 7: Standards and regulations should be used as the basis and should be augmented to improve these areas while incorporating long-term organisational sustainability. Organisations are arguably reluctant to invest in long-term project management social well-being as it could inflate project and organisational costs in the short term.

Training, education and organisational learning investigated how the organisation approached training and education of end-users. The results indicate that 37% of respondents' organisations included some form of activities for training and education of end-users, but only where applicable. Furthermore, 25% indicated that IS projects included training and education activities for team members for improved individual and team performance. This implies that training and education are primarily done ad hoc, while only one in four organisations focus specifically on improving IS project performance by training team members. Some 80% of IS projects were between maturity levels 1 and 3 where the aim is basic training. No emphasis is placed on upskilling stakeholders or the community at large.

Proposition 8: Training in IS projects has often been debated as a critical area which is frequently overlooked. There is empirical evidence to show that training and education should be taken more seriously, as this would lead to long-term benefits for future projects and the organisation (Ram, Wu, & Tagg 2014; Ramazani & Jergeas 2015; Wang, Chang, Jiang & Klein 2011).

The society and customers aspect dealt with the organisation's, and therefore the IS project's, approach to social responsibility. For the majority of the projects (54%), organisations took a minimalist stance to their social responsibility during an IS project. The implication is that organisations are not concerned with how their suppliers and partners address social responsibility. The narrow-minded approach is arguably not sustainable in the long term as organisations will always have a direct or indirect impact on society and customers (Institute of Directors Southern Africa 2009).

Bribery and anti-competitive behaviour are the final aspect of the social dimension and assessed the extent to which bribery and anti-competitive behaviour were covered. The results show that bribery and anti-competitive behaviour were rejected and that stakeholders were held responsible and accountable. Although this implies a positive approach to the problem of bribery, the question remains whether organisations actively monitor it or if it is monitored at a particular point in an IS project's lifespan. Comparably, the results imply that organisations were not concerned with how their suppliers and partners dealt with bribery and anti-competitive behaviour. Bribery and corruption are especially notorious in South Africa and Africa as a whole and thus should be rigorously monitored, identified and eradicated.

Proposition 9: IS project managers should be more vigilant when dealing with the various aspects of the social dimension. Once again, the seven aspects are not inculcated in the day-to-day management of an IS project and IS project managers should ensure that these aspects are dealt with on a daily basis. Awareness of these

aspects will eventually lead to implementation and improvement of the maturity of the social dimension.

The objectives of the research were to determine whether IS project managers focus on the three dimensions of sustainability and also to determine whether these project managers distinguish between the short- and long-term aspects of sustainability in project management. Three research questions were subsequently formulated to achieve these objectives. Research question 1 determined whether the environmental dimension was imbedded in the project management of business and/or IS projects. The results imply that the environmental dimension is not embedded. Organisations have a short-term focus on cost and time rather than a long-term focus on environmental project management sustainability. Furthermore, policies with regard to environmental aspects are almost non-existent. The development and implementation of policies are therefore necessary for project and organisational sustainability. Concepts such as alternative energy, recycling and reuse of resources should be considered. This could lead to reduced project budgets in the long term and have a positive effect on the other dimensions of society and the economy. It is therefore imperative that current project management processes be actively redesigned to ensure overall organisational sustainability.

Research question 2 determined whether the social dimension was imbedded in the project management of business and/or IS projects. The results imply that the social dimension is not embedded in the project management of business and/or IS projects. There is a serious lack of focus on the social dimension as organisations do the bare minimum rather than go the extra mile to ensure the social well-being of all stakeholders. More emphasis should be placed on how suppliers and partners incorporate the social dimension as this often has a direct impact on the organisation. This unfortunately aligns with the notion that the social dimension is not taken into account. This goes against the spirit of the King III report, which stipulates that the inequalities of apartheid need to be redressed (Institute of Directors Southern Africa 2009).

Research question 3 determined whether the economic dimension was imbedded in the project management of business and/or IS projects. The results imply that the economic dimension is somewhat imbedded in the project management of business and/or IS projects. Organisations have a short- to medium-term approach to economic sustainability. However, there is arguably significant pressure to satisfy stakeholders in the interim, especially those with financial interests. Alternatively, it is debatable whether organisations create a flexible and adaptable management culture of sustainability. This causes those involved in IS projects to focus on short- rather than long-term economic sustainability.

The results clearly highlight that sustainability in project management is not achieved and that it is a prerequisite for project sustainability and ultimately organisational sustainability. The question is then whether the deliverables of IS projects can be sustainable when sustainability is not involved in the creation of such deliverables. An IS project's deliverable can be sustainable and contribute to the organisation's sustainability even when the three dimensions of sustainability are not involved in the implementation of the project. Nevertheless, it is preferable for the three dimensions to also be involved during the implementation of the project. IS project managers need to focus on both sustainability in project management as well as project sustainability. This will ensure a sustainable product or service which will lead to organisational sustainability.

Conclusion

Research on sustainability in project management is primarily conducted in the fields of construction and engineering as they have a direct impact on the environment. There is, however, a research gap regarding sustainability in IS project management. The aim of this article was to address this research gap and determine whether the three sustainability dimensions of environment, social and economic are incorporated into the management of an IS project. Overall, the results presented three revelations. Firstly, the environmental dimension is not embedded as organisations have a short-term focus on cost and time rather than a long-term focus. Secondly, the social dimension is not embedded in the project management business and/or IS projects as organisations do the bare minimum rather than go the extra mile to ensure the social well-being of all stakeholders. Finally, the economic dimension is somewhat embedded in the project management of business and/or IS projects, as organisations aim to provide the project sponsor and other stakeholders with short-term financial benefits. The implication is that organisations do not look at the "bigger picture" as there is a perpetual focus on the short- rather than the long-term sustainability of IS project management.

This research contributes to scholarship in three ways. It fills the gap of limited research on sustainability in the African continent and highlights that sustainability in business or IS projects is not being considered. A second contribution of this research is that it highlights business or IS projects. The results of the research reported on in this article can be applied internationally and thus the research contributes to the limited body of knowledge on IS project sustainability. The third contribution is more of a theoretical one. Through deductive reasoning, it was realised that there is a difference between sustainability in project management and project sustainability.

The first concept is the incorporation of sustainability best practices in project management, whereas the second is the delivery of a sustainable product or service.

The practical implications of this research are that a multifaceted approach can be used by organisations to incorporate sustainability into business and IS projects. Project managers should first of all incorporate sustainability into normal project management best practices. This will force project managers to start thinking about sustainability and the impact their actions and decisions will have on the three dimensions of sustainability. Products and services cannot be delivered without a long-term view of benefits and sustainability. Ultimately, the sustainable products or services contribute to organisational sustainability.

Limitations were discovered in the application of the questionnaire, even though it was designed on the basis of the questionnaire of Silvius et al. (2012). The questionnaire first of all only allows for an explorative analysis of IS project sustainability. Secondly, statistical techniques such as inferential and multivariate statistics are not possible.

Future research will focus on whether the various aspects discussed in this article pertaining to the economic, environmental and social dimensions are grouped correctly. Furthermore, the strength of the relationship between the three dimensions will also be investigated. This will allow organisations to determine the impact of their decisions in one dimension on the other two dimensions. Future research will also be more focused through semi-structured interviews to determine whether new insights can be obtained from middle and top management owing to the dynamic nature of the economic and social environment.

Organisations no longer have the luxury of thinking that business and IS projects do not have to comply with sustainability development. Sustainability should be enforced as part and parcel of IS projects and project managers should be given training to enable them to incorporate sustainability in IS project implementation.

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